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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,265	07/09/2004	Osamu Akiba	Q73735	7486

23373 7590 10/27/2011

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EXAMINER	
DAHIMENE, MAHMOUD	
ART UNIT	**PAPER NUMBER**
1713	

NOTIFICATION DATE	DELIVERY MODE
10/27/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/501,265	AKIBA ET AL.	
	Examiner	Art Unit	
	MAHMOUD DAHIMENE	1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 October 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *1 and 3-10* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1, 3-10* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Withdrawal of previous finality

The finality of the office action mailed on 5/9/11 is withdrawn in order to address the issues and arguments raised by applicant pertaining to the limitation of "wherein the fibers are not wetted upon passing through said mist"

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1, 3, 10 and all dependent claims are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear how the fibers are not wetted upon passing through the mist space because the presence of mist would wet to some degree even if only for a fraction of a time before such a mist is evaporated. The smallest fraction of time a liquid particle contacts a surface could be considered wetting. Applicants have no adequately explained what is encompassed by the phrase "not wetted" since any contact with the smallest liquid particle could be considered wetting the fiber, to a degree.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1, 3, 10, are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The disclosure is not enabling for not wetting the fibers upon passing through the said mist. One of ordinary skill in the art would not be able to appraise the degree of wettability since applicants do not give any indication as to how to measure the degree of wettability or the degree of dryness of the fibers while they are in the mist. Furthermore, the prior art would seem to indicate that the surface of the fibers would be wetted in applicants proposed process because the fibers are passing through a mist and could normally contact liquid particles thereby meeting the definition of being wetted. In addition the applicant is only making an assumption that the fibers are not wetted, since no proof, substantiated with a measurement, has be provided in the specification.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 3-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angadjivand et al. (US 6,375,886) in view of Morozov et al. (US 2002/0048770).

It is unclear how the fibers are not wetted upon passing through the mist space because the presence of mist would wet to some degree even if only for a fraction of a time before such a mist is evaporated. The smallest fraction of time a liquid particle contacts a surface could be considered wetting. Applicants have no adequately explained what is encompassed by the phrase “not wetted” since any contact with the smallest liquid particle could be considered wetting the fiber, to a degree.

Angadjivand discloses a method and apparatus for charging fibers that contain a nonconductive polymer. A polar liquid 32, 34 is sprayed onto free-fibers 24, and the free-fibers 24 are then collected to form an entangled nonwoven fibrous web 25 that may contain a portion of the polar liquid. The nonwoven web 25 is then dried 38. By applying an effective amount of polar liquid 32, 34 onto the nonconductive free-fibers 24 before forming the nonwoven web 25, followed by drying 38, the individual fibers 24

become charged. The ethod and apparatus enable the fibers 24 to be charged during web manufacture without subsequent processing (abstract). Angadjivand cites “The spraying mechanisms 28, 30 may be used separately or simultaneously from multiple sides. The spraying mechanisms 28, 30 may be used to spray a vapor of polar liquid such as steam, an atomized spray or mist of fine polar liquid droplets, or an intermittent or continuous steady stream of a polar liquid. In general, the spraying step involves contacting the free fiber with the polar liquid by having the polar liquid supported by or directed through a gas phase in any of the forms just described. The spraying mechanisms 28, 30 may be located essentially anywhere between the die 20 and the collector 26. For example, in an alternate embodiment shown in FIG. 1, spraying mechanisms 28', 30' are located closer to the collector and even downstream to a source 36 that supplies staple fibers 37 to the web 25. (15) Spraying the free-fibers while they are in a molten state or in a semi-molten state has been found to maximize the imparted charge. The spraying mechanisms 28, 30 are preferably located as close to the stream of free-fibers 24 as possible (distances e and f are inimized), without interfering with the flow of free-fibers 24 to the collector 26. The distances e and f are preferably about 30.5 cm (one foot) or less, more preferably less than 15 cm (6 inches), laterally from the free fiber. The polar liquid may be sprayed perpendicular to the stream of free-fibers or at an acute angle, such as at an acute angle in the general direction of free-fiber movement” (column 7, line 40-65), “The polar liquid is sprayed on the fibers in quantities sufficient to constitute an "effective amount." That is, the polar liquid is contacted with the free-fibers in an amount sufficient to enable an electret to be

produced using the process of the invention. Typically, the quantity of polar liquid used is so great that the web is wet when initially formed on the collector. It may be possible, however, for no water to be present on the collector if, for example, the distance between the origin of the free-fiber and the collector is so great that the polar liquid dries while on the free-fiber rather than while on the collected web" (column 8, line 12), "The amount of polar liquid that is sprayed on the web may vary depending on the fiber production rates."

Angadjivand recognizes the need for "fine polar liquid droplets".

Angadjivand recognizes that the amount of water (polar liquid droplets) is a result effective variable effective in controlling the fibers drying process, Angadjivand teaches "It may be possible, however, for no water to be present on the collector if, for example, the distance between the origin of the free-fiber and the collector is so great that the polar liquid dries while on the free-fiber rather than while on the collected web", "The amount of polar liquid that is sprayed on the web may vary depending on the fiber production rates."

It is noted that Angadjivand proposes "spraying mechanisms 28, 30 may be used to spray a vapor of polar liquid such as **steam**, an atomized spray or mist of fine polar liquid droplets", and does not expressly disclose the average diameter of the droplets is less than 20 microns.

Morozov discloses electrospraying solutions of substances for mass fabrication of chip and libraries. The reference of Morozov is not relied on to teach Electrospraying solutions of substances for mass fabrication of chips and libraries, but is only relied on to teach that in the art of spraying a liquid, droplets sizes ranging from 0.3 to 20 microns in diameters are conventionally obtained and known for their capability of obtaining a level where evaporation in the droplets stream becomes possible.

Morozov teaches

"*The method of electrospray is the electrostatic atomization of a liquid or a solution to obtain charged microdroplets, charged clusters and ions. The solution or liquid of the substance to be deposited is placed into a capillary (or array of capillaries), and the application of high voltage results in instability of the liquid or solution, which is then dispersed into small charged droplets 0.3-20 microns in diameter, and typically about 0.5-2 microns in diameter. Electrostatic repulsion rapidly moves these charged microdroplets from the capillary tip, and in their travel toward a substrate surface, the microdroplets evaporate if solvent vapor pressure is low enough, and the size of the droplets reach a Raleigh limit of electrostatic stability. Afterwards, the microdroplets undergo a series of decays, reducing their size to about 10-20 nm and increasing the electrostatic field to a level where evaporation of ionized solvated molecules becomes possible. On further travel through a dry gas, solvent is lost from these solvated ionized molecules. Where evaporation proceeds rapidly, all of the solute content of the microdroplets can be concentrated into small nanoclusters (FIG. 1).*

[0006] Electrospray of solutions in solvents with low vapor pressure, such as water, electrospray in atmosphere containing large amount of solvent vapor or where the electrospray source is at a short distance from the substrate surface for deposition, can allow microdroplets to reach the substrate without complete decay and evaporation of all the solvent. This regime is referred to as wet electrospray. The deposition of charged molecules or clusters occurs in a dry electrospray regime where volatile solvents is used and the conditions of low partial vapor pressure of the solvent in gas or a longer distance between the electrospray source and the substrate surface is used.

[0007] Accordingly, this electrospray phenomena permits the deposition of substances in the form of charged microdroplets, solvated or dry ionized molecules, or nanoclusters. Nanoclusters or fibers can be produced by electrospray from linear polymers. The form of deposit can be regulated by

changing the travel path of the charged species and their speed, by control of vapor pressure in the atmosphere, and by the proper choice of solvent and solution concentration" (paragraphs 0005-0007)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Angadjivand by using the conventional electrospray method disclosed by Morozov because Morozov teaches the advantages of the electrospray method in delivering microdropletes, reducing their size to about 10-20 nm and increasing the electrostatic field to a level where in stream evaporation becomes possible.

One of ordinary skill in the art would have been motivated to modify the process of Angadjivand by using the electrospray method in order to regulate the form of the deposit with the added flexibility of changing the travel path and speed of the sprayed material as well as the microdroplets evaporation capabilities, as suggested by Morozov, thereby, further enhancing the capability of adjusting the amount of water (polar liquid droplets) reaching the fiber which is recognized by Angadjivand as a result effective variable affecting the "production rates", it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

The result of the combined method of Angadjivand and Morozov would have resulted in fibers that are not wetted since the fine droplets of Morozov wiuld have practically dried instantly, definitely before the fibers hit the substrate of Angadjivand

As to claim 3, it is noted Angadjivand does not expressly disclose the droplet versus fiber content, however, Angadjivand discloses “The polar liquid is sprayed on the

fibers in quantities sufficient to constitute an "effective amount." That is, the polar liquid is contacted with the free-fibers in an amount sufficient to enable an electret to be produced using the process of the invention" As indicated above. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to spray the polar liquid on the fibers in quantities sufficient to constitute an "effective amount." That is, the polar liquid is contacted with the free-fibers in an amount sufficient to enable an electret to be produced using the process of the invention since Angadjivand teaches adjusting the liquid droplets content is necessary in order to obtain the desired results. Angadjivand recognizes that the amount of water (polar liquid droplets) is a result effective variable effective in controlling the fibers drying process, Angadjivand teaches “It may be possible, however, for no water to be present on the collector if, for example, the distance between the origin of the free-fiber and the collector is so great that the polar liquid dries while on the free-fiber rather than while on the collected web”, “The amount of polar liquid that is sprayed on the web may vary depending on the fiber production rates.”

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use any relative amount of droplets versus fiber content including the amount claimed by the applicant in claim 3 since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

As to claim 4, Angadjivand discloses Cooperating gas orifices 23--through which a gaseous stream, typically heated air, is forced at high velocity--are positioned proximate die orifice 22 to assist in drawing the fiber-forming material through the orifice 22 (column 6, line 40).

As to claim 5-6, Angadjivand discloses "nonconductive" means possessing a volume resistivity of about 10.sup.14 ohm.cm **or greater** at room temperature (column 4, line 40). Angadjivand discloses a volume resistivity range that overlaps applicant's claimed range. Overlapping ranges are held obvious.

As to claim 8, Angadjivand also discloses "Some other hindered amines are also known to increase the filtration-enhancing charge imparted to the web" (column 12, line 15)

As to claim 10, Angadjivand discloses the apparatus comprising (1) a means for melt-extruding a thermoplastic resin containing electrical-chargeability enhancing agents to form thermoplastic resin fibers; (2) a means for spraying droplets consisting essentially of a polar liquid to a space downstream of a direction of said thermoplastic resin extruded from said means for melt-extruding a thermoplastic resin, to thereby form a mist space, the average diameter of said droplets being less than 20 pm; and (3) a means for collecting said thermoplastic resin fibers which have been passed through said mist space.

Response to Arguments

Applicant's arguments filed on 10/11/2011 have been considered, but they are not persuasive, because applicant's arguments are mostly based on the limitation pertaining to the allegation that "the fibers are not wetted upon passing through said mist space" which, according the applicant, is not taught or suggested by the prior art of record.

First the applicant states, in the specification, that "It is believed that smaller droplets have a higher surface tension, and thus, do not wet the thermoplastic resin fibers" (paragraph 0008 of PGPub US 2005/0077646).
The applicant does not have a positive proof, or a measurement, showing that the fibers passing through the mist (of water/polar liquid) are "not wetted", but the applicant believes so. In the final rejection of 5/9/11, The reference of Angadjivand is relied on to disclose a method and apparatus for charging fibers that contain a nonconductive polymer. A polar liquid 32, 34 is sprayed onto free-fibers 24, and the free-fibers 24 are then collected to form an entangled nonwoven fibrous web 25 that may contain a portion of the polar liquid. The polar liquid may be sprayed perpendicular to the stream of free-fibers or at an acute angle, such as at an acute angle in the general direction of free-fiber movement" (column 7, line 40-65), "The polar liquid is sprayed on the fibers in quantities sufficient to constitute an "effective amount." That is, the polar liquid is contacted with the free-fibers in an amount sufficient to enable an electret to be produced using the process of the invention. Typically, the quantity of polar liquid used is so great that the web is wet when initially formed on the collector. It may be possible,

however, for no water to be present on the collector if, for example, the distance between the origin of the free-fiber and the collector is so great that the polar liquid dries while on the free-fiber rather than while on the collected web" (column 8, line 12), "The amount of polar liquid that is sprayed on the web may vary depending on the fiber production rates".

The office action acknowledges that Angadjivand proposes "spraying mechanisms 28, 30 may be used to spray a vapor of polar liquid such as steam, an atomized spray or mist of fine polar liquid droplets", and does not expressly disclose the average diameter of the droplets is less than 20 microns. However, Morozov teaches a spay system where "the microdroplets undergo a series of decays, reducing their size to about 10-20 nm and increasing the electrostatic field to a level where evaporation of ionized solvated molecules becomes possible (paragraph 0007)" and "[0007] Accordingly, this electrospray phenomena permits the deposition of substances in the form of charged microdroplets, solvated or dry ionized molecules, or nanoclusters. Nanoclusters or fibers can be produced by electrospray from linear polymers. The form of deposit can be regulated by changing the travel path of the charged species and their speed, by control of vapor pressure in the atmosphere, and by the proper choice of solvent and solution concentration (paragraphs 0005-0007)"

A statement of obviousness and motivation to combine Morozov to Angadjivand was provided in the office action, the applicant did not comment on why it would not be obvious to combine both references. It is the examiner's position that the combination of

reference would have resulted in a method where the fibers are not wetted upon passing through said mist space since Morozov teaches fine droplets 0.3 to 20 microns or 10-20 microns (paragraph 005) which have a size overlapping applicant's claimed range.

Morozov is combined because it teaches the concept of using fine particles for the purpose of fast drying. It is permissible to combine an art of a different endeavor if the combination of the new art can solve or improve upon a known problem. Angadjivand recognizes that the quantity in the spray has a direct effect on how fast the fibers are dried, up to the point of drying befor reaching the collecting surface. Morozov teaches fine droplets 0.3 to 20 microns or 10-20 microns (paragraph 005) which have a size overlapping applicant's claimed range can dry even faster.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MAHMOUD DAHIMENE whose telephone number is (571)272-2410. The examiner can normally be reached on week days from 8:00 AM. to 5:00 PM..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. D./
Examiner, Art Unit 1713

/Nadine G Norton/

Supervisory Patent Examiner, Art Unit 1713